STUDIES OF PACIFIC ISLAND PLANTS, IV
NOTES ON FIJIAN FLOWERING PLANTS

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In the present paper a discussion of several species in various families is presented and five species, based for the most part on recently collected material, are described as new. I am indebted to Dr. L. Croizat for the descriptions of two new species of Euphorbiaceae, here included. Herbaria in which cited specimens are deposited are indicated by parenthetical abbreviations: Arnold Arboretum (A), Bernice P. Bishop Museum (Bish), Gray Herbarium (GH), New York Botanical Garden (NY).

POTAMOGETONACEAE

Diplanthera uninervis (Forsk.) Aschers. in E. & P. Nat. Pfl. Nachtr. 1: 37. 1879; F. N. Will. in Bull. Herb. Boiss. II. 4: 221. 1904; Aschers. & Graebn. in Pflanzenr. 31 (IV. 11): 152. 1907; Greenwood in Jour. Arnold Arb. 25: 402. 1944.

Viti Levu: Nandronga: Thuvu, *Greenwood 927* (GH) (in sand above and below low water mark on shores; broken pieces cast up in large quantities), *Greenwood 927B* (GH) (on beach); Serua: Naitonitoni Beach, near Navua River, *Greenwood 927A* (GH).

The recent Fijian collections of this widespread species are of interest because of the paucity of Pacific specimens in herbaria. The species has previously been reported from Fiji, usually as *Halodule australis* Miq., but a definite collection has been cited only by Greenwood (l. c.). The plant is not accounted for in Seemann's Flora Vitiensis.

HYDROCHARITACEAE

Hydrilla verticillata (L. f.) Royle, Ill. Bot. Himal. 376. 1839; Presl, Bot. Bemerk. 112. 1844 [adv. repr. from Böhm. Ges. Wiss. Abh. V. 3: 542. 1845]; Caspary in Bot. Zeit. 14: 901. 1856; Benth. Fl. Austral. 6: 259. 1873; Aschers. & Gürke in E. & P. Nat. Pfl. II. 1: 250. *f. 184, A, B.* 1889; Gagnep. in Lecomte, Fl. Gén. Indo-Chine 6: 4. *f. 2.* 1908; Koorders, Exkursionsfl. Java 1: 94. 1911, Atlas 1: *f. 21.* 1913; F. M. Bailey, Compr. Cat. Queensl. Pl. 518. 1913; Greenwood in Jour. Arnold Arb. 25: 403. 1944.

Serpicula verticillata L. f. Suppl. 416. 1781; Roxb. Pl. Coast Corom. 2: *pl. 164.* 1798.

Viti Levu: Nandi: Tuna River, *G. Dennis 955* (GH) (forming extensive mats in tidal waters in the dry season, but washed out in large quantities during heavy rains in the wet season; in flower Nov. 10, 1942).

The cited specimen must be considered one of the most interesting recently obtained in Fiji, as it extends the range of *Hydrilla* into the Pacific area. From records which I can locate, the nearest stations are in the East Indies and Australia, the species apparently not having been noted from either New Guinea or New Zealand. Our specimens bear young staminate flowers, which are still in the membranaceous muricate spathes. Mr. Greenwood (in litt.) expresses the opinion that *Hydrilla* was probably introduced into Fiji.

EUPHORBIACEAE

By L. CROIZAT

Cleistanthus micranthus Croizat, sp. nov.

Arbuscula 5-metralis, innovationibus pilis perpaucis brevibus exceptis glabris subangulatis, ramis adultioribus dissite irregulariterque lenticellatis. Foliis distichis ellipticis plus minusve falcatis 7–9 cm. longis, 2–3 cm. latis, glaberrimis, subcoriaceis, pallide brunneo-olivaceis subconcoloribus, margine integerrimo subrevoluto, nervis late patentibus, margine anastomosatis, gracilibus, ca. 8-jugis, petiolo ruguloso vix 0.5 cm. longo, stipulis coriaceis late triangularibus integris ad 1 mm. longis et 1 mm. basi latis. Inflorescentiis more generis axillaribus pulviniformibus, vix 0.5 cm. latis et longis, plurifloris squamulosis glabris, secus ramulum dissitis. Flore ♂ anthesi vix ineunte viso: calyce glabro subgloboso ca. 1.2 mm. lato, laciniis triangularibus crassiusculis oblongo-deltoideis ca. 1.3 mm. longis, 0.7–0.8 mm. latis, petalis minutis albicantibus subdolabriformibus cuspidatis, ca. 0.5 mm. longis, 0.6–0.7 mm. latis, disco annulari-pulvinato integro ca. 0.25 mm. alto; staminibus pro ratione floris magnis, brevibus, oppositisepalis, antheris oblongis ca. 0.7 mm. longis et 0.6 mm. latis, apiculatis, basi divaricatim sagittatis, filamento crassiusculo ca. 0.5 mm. longo; pistillodio ovoideo ca. 0.8 mm. longo, apice 3-partito, laciniis aequalibus stylum cum stigmatibus simulantibus. Floris ♀ perianthio unico sub fructu viso, putrido, saltem annotino, ca. 3 mm. lato, breviter stipitato, columella ca. 3.5 mm. longa, basi florum ♂ hornotinorum glomerulis fulto.

VITI LEVU: Serua: In hills, alt. about 200 m., *Greenwood 1018* (A, TYPE), May, 1943 (tree 5 m. high).

This is the first record of *Cleistanthus* Hook. f. in the Fiji Islands. The genus has so far been known only from certain islands of Micronesia, such as the Pelew and Truk groups (*C. carolinensis* Jabl., *C. insularis* Kanehira, *C. angularis* Kanehira, *C. Morii* Kanehira), and New Caledonia (*C. stipitatus* Muell. Arg.), not to mention points farther west, from Australia to eastern Africa, which represents its probable center of dispersal. *Cleistanthus micranthus* is most nearly allied to *C. stipitatus* Muell. Arg., but differs in the spreading primaries, the less coriaceous and blunter leaf, and the smaller, glabrous inflorescence. In the classification of Jablonszky (in Pflanzenr. 65[IV. 147. VIII]: 35. 1915), *C. micranthus* apparently falls into Sect. *Australes* Jabl., together with *C. stipitatus* (Baill.) Muell. Arg. and *C. Dallachyanus* (Baill.) Benth. Thus composed, this section ranges from Australia to New Caledonia and the Fiji Islands.

Croton Parhamii Croizat, sp. nov.

Frutex innovationibus hispido-pubescentibus, serius glabrescentibus, trichomatibus saepius brunneis pilo centrali porrecto. Foliis elliptico-lanceolatis brunnescentibus, 3–9 cm. longis, 2–4 cm. latis, tenuiter chartaceis, apice sat obtuse acuminatis, basi rotundatis vel rotundato-cuneatis, margine sat obscure crenato-dentatis, supra glabris, subtus trichomatibus saepissime stellatis hispidis in lamina parcius in costa crebre indutis, venis penninerviis arcuato-adscendentibus anastomosantibus ca. 8–12-jugis, primo jugo haud triplinervio; petiolo gracili aeque ac innovationibus induto 0.5–2 cm. longo, glandulis posticis ad basim laminae 2, breviter stipitatis disciformibus.

Inflorescentia subspicata ad 10 cm. longa. Floribus ♂ : pedicello ca. 3–6 mm. longo, perianthio in alabastro subglobuloso, in anthesi latius cyathiformi (ut videtur), ca. 2 mm. longo et 3 mm. lato, petalis cum sepalis subaequilongis, staminibus ca. 10. Floribus ♀ : perianthio extus pubescente late campanulato ca. 3 mm. longo et 5 mm. lato, pedicello 8–10 mm. longo, perianthii lobis ad basim liberis ellipticis, ca. 1–2 mm. longis et 1.5 mm. latis, margine integris, uno alterove interdum subanisomero, petalis glandulisque ut videtur nullis, ovario late ovoideo indumenti copia brunneo-hispidulo, ca. 1.5 mm. magno in stylum evidenter abeunte; stylorum cruribus 3, pro ratione sat crassis, nigris, epapillosis dorso puberulis, ca. 2 mm. longis, fere ad basim 2-partitis, columella fructu delapso gracili ad 5 mm. longa.

VITI LEVU: Tholo West: Ridge between Naloka and Naraiyawa, in forest, alt. about 900 m., *B. E. Parham 2464* (A, TYPE), July 26, 1938.

The slightly accrescent ♀ perianth in fruit, with evolute lobes at anthesis, readily distinguishes this new species from *C. heterotrichus* Muell. Arg., which it suggests at first in the pubescence of the lower leaf-surface. *Croton Storckii* (Muell. Arg.) Seem. has a different foliage and ♀ perianth, with a much smaller ovary and scarcely accrescent lobes. *Croton Verreauxii* Baill. is an Australian species, with a ♀ perianth that has characters similar to those of *C. Storckii*. *Croton microtiglium* Burk. is known only from Tonga and suggests the characters of *C. leptopus* Muell. Arg., to judge from the description and an authentic specimen of the latter here available. *Croton Levatii* Guillaumin, of the New Hebrides, is very summarily described (in Bull. Soc. Bot. France 66: 275. 1919), but the remark "sepalis petalisque angustioribus" rules out *C. Parhamii*.

ELAEOCARPACEAE

Elaeocarpus cassinoides A. Gray, Bot. U. S. Expl. Exped. 1: 204. 1854; C. Muell. in Walp. Ann. 4: 331. 1857; Seem. Fl. Vit. 29. 1865; Hemsl. in Jour. Linn. Soc. Bot. 30: 171. 1894.

VANUA LEVU: Mbua: Mbua Bay, *U. S. Expl. Exped.* (GH, TYPE COLL.); lower Wainunu River Valley, alt. 0–200 m., *Smith 1735* (GH) (tree 13 m. high, in open forest; native name: *wailoaloa*). KORO: Eastern slope of main ridge, alt. 200–300 m., *Smith 1007* (GH) (spreading tree 23 m. high, in dense forest; trunk 1 m. diam.); western slope, alt. 300 m., *Smith 1086* (GH) (tree 14 m. high, in thickets; petals pale pink).

Elaeocarpus cassinoides has previously been known only from the type collection, a fruiting specimen. Although it was originally reported by Gray from both Fiji and Tonga, its occurrence in the latter group is questionable; Gray remarks, "Those [specimens] from the two localities, as ticketed, are so exactly alike that they might have been taken from the same stem, and, since the habitats are not to be verified from Dr. Pickering's notes, one or the other may be considered doubtful." Mueller, Seemann, and Hemsley, in the publications cited above, repeat Gray's data without citing additional specimens, and it seems that the species has not been re-collected in Tonga. Since the Fijian specimens cited above are obviously conspecific with the type, I believe that the record of this species from Tonga is erroneous. In view of the inadequacy of the original descrip-

tion, I here redescribe the species. Of the cited specimens, *Smith 1007* and *1086* are in flower and the others in fruit.

Tree, up to 23 m. high, the branchlets subterete, slender, brownish, at first pale-puberulent, soon glabrescent; petioles puberulent and glabrescent like the branchlets, slender, canaliculate, 5–15 mm. long; leaf-blades papyraceous or chartaceous, oblong- or obovate-elliptic, 5–10 cm. long, 2–4.5 cm. broad, subacute to attenuate at base, obtuse or obtusely cuspidate at apex, inconspicuously serrulate especially distally (teeth 2 or 3 per centimeter), glabrous on both surfaces or obscurely puberulent on nerves beneath when young, the costa plane or slightly raised above, prominent beneath, the secondary nerves 4–7 per side, erecto-patent, anastomosing, usually prominulous above and slightly raised beneath, the veinlet-reticulation lax, prominulous on both sides or obscure above; racemes axillary, usually 3–4 cm. long at anthesis, 12–17-flowered, short-pedunculate, the rachis and pedicels pale-puberulent, the bracts submembranous, lanceolate, 2–3 mm. long, acute, sparsely puberulent, soon caducous, the pedicels 2–3.5 mm. long at anthesis; sepals 5, submembranaceous, deltoid-oblong, 1.5–2 mm. long, 0.7–1.2 mm. broad, subacute, puberulent on margins, otherwise glabrous, carinate within; petals 5, glabrous, submembranaceous, obovate-cuneate, 1.3–1.7 mm. long, 0.8–1.2 mm. broad, fimbriate with 6–8 lobes, these subequal, obtuse, about 0.3 mm. long; disk 5-lobed, the lobes about 0.4 mm. high and 0.7 mm. broad, each copiously hispidulous and deeply sulcate; stamens 15 or 16, uniseriate, about 3 mm. long, the filaments slender, glabrous, about 0.6 mm. long, the anthers oblong, hispidulous throughout, obtuse, about 0.7 mm. long; ovary and base of style pale-puberulent-hispidulous, the locules 2, each biovulate, the style 0.4–0.5 mm. long, bifid; fruiting inflorescence often shortened by loss of apical portion of rachis, the pedicels stout, 4-5 mm. long, glabrous; fruit glabrous, obovoid, 14–16 mm. long and 8–11 mm. broad at apparent maturity, the pericarp about 3 mm. thick including the rugulose epicarp and the nearly smooth hard endocarp, the locule usually solitary, the dissepiment rarely persistent.

For the time being I am unable to refer *E. cassinoides* to its appropriate section. It is probably related to such New Guinean sections as § *Dactylosphaera* Schlechter and § *Fissipetalum* Schlechter, but it does not entirely agree with either of these. Another Fijian species of this general relationship is *E. kasiensis* A. C. Sm., which was originally referred to § *Dicera*. However, since I have studied the New Guinean species of *Elaeocarpus* and looked into the typification of § *Dicera* (see Jour. Arnold Arb. 25: 223. 1944), I realize that the two Fijian species here discussed should not be placed in § *Dicera*. A study of all the Pacific species is advisable before these can be properly placed. Two other Fijian species possibly of this relationship, both very inadequately known, are *E. laurifolius* A. Gray and *E. pyriformis* A. Gray.

Elaeocarpus (§ *Dicera*) **pittosporoides** sp. nov.

Arbor ad 6 m. alta partibus florum exceptis ubique glabra, ramulis gracilibus teretibus cinereis; foliis apicem ramulorum versus confertis, petiolis leviter canaliculatis gracilibus 1–2 cm. longis, laminis subcoriaceis vel chartaceis in sicco fuscis vel olivaceis, obovato-ellipticis, 6.5–10 cm. longis, 2.5–4.5 cm. latis, basi attenuatis et in petiolum decurrentibus, apice

obtuse cuspidatis, margine leviter recurvatis et remote undulato-crenulatis, costa utrinque valde elevata, nervis lateralibus utrinsecus 6–8 erecto-patentibus anastomosantibus et rete venularum laxo utrinque plus minusve prominulis; racemis axillaribus subpendulis ad 6 cm. longis 2–4-floris, pedunculo interdum ad 3 cm. longo et rhachi gracilibus substriatis, bracteis mox caducis, pedicellis gracillimis sub anthesi 2–2.5 cm. longis; sepalis 5 papyraceis vel subcarnosis oblongis, 5.5–6 mm. longis, 1.5–2 mm. latis, subacutis, extus glabris, intus minute puberulis et conspicue carinatis, margine leviter incrassatis; petalis 5 submembranaceis, obovatis, longitudine sepalos aequantibus, 2.5–3 mm. latis, intus basim versus paullo tomentellis ceterum glabris, apice 3–5-lobulatis, lobis 1–2 mm. longis subacutis; disco annulari-pulvinato circiter 0.5 mm. alto obscure 5-lobato superne sparse hispidulo; staminibus 26 vel 27 circiter 3.5 mm. longis 1- vel 2-seriatis ubique minute papilloso-hispidulis, filamentis subteretibus 1–1.5 mm. longis, antheris 2–2.5 mm. longis, apice subacutis erostratis; gynaecio glabro, ovario ovoideo 2-loculari, loculis 4-ovulatis, stylo crasso subulato 2–2.5 mm. longo.

VITI LEVU: Namosi: Hills between Navua River and Suva, alt. 200–300 m., *Greenwood 1010* (A, TYPE), May, 1943 (upright tree 5–6 m. high; inflorescences in leaf-axils near apices of branchlets; flower-buds yellow, somewhat dependent on very thin pedicels).

Elaeocarpus pittosporoides appears to have no close relatives among the known Fijian species. I have recently (in Jour. Arnold Arb. 25: 223. 1944) had occasion to discuss the typification of § *Dicera*, to which the new species definitely belongs. In floral characters it is very similar to *E. dentatus* (J. R. & G. Forst.) Vahl, the type of the section, but in foliage and in its slender lax inflorescences it is quite different.

TILIACEAE

Brownlowia sp.

VITI LEVU: Lautoka: Mountains near Lautoka, alt. about 550 m., *Greenwood 957* (A) (shrub or small tree); Namosi: Hills between Navua River and Suva, alt. about 250 m., *Greenwood 957A* (A); vicinity of Namuamua, alt. 400 m., *Gillespie 3000* (GH); Rewa: Slopes of Korombamba Mt., alt. 200 m., *Gillespie 2372* (GH).

The cited specimens indicate a substantial extension of the known range of *Brownlowia;* all are sterile, but their place in the genus seems certain, and it is nearly equally certain that they represent an undescribed species. The Fijian specimens are probably of the relationship of *B. argentata* Kurz, as this is represented by material from New Guinea and the Solomon Islands. The occurrence of the genus in the New Hebrides, not previously reported, is indicated by *Kajewski 616* (A) from Vanikoro, a specimen probably referable to *B. argentata*. From this species the Fijian specimens differ in obvious foliage characters, the leaf-blades being longer and with more numerous lateral nerves.

Yuncker (in Bishop Mus. Bull. 178: 80. 1943) has recently reported *Brownlowia* from Niue, also in sterile condition; this record appears to be the easternmost for the genus.

ELATINACEAE

Elatine gratioloides A. Cunn. in Ann. Nat. Hist. 4: 26. 1840; Nied. in E. & P. Nat. Pfl. ed. 2. 21: 276. 1925; Greenwood in Jour. Arnold Arb. 25: 398. 1944.

Elatine americana sensu Hook. f. Fl. Nov. Zel. 1: 27. 1853.

Elatine americana var. *australiensis* Benth. Fl. Austral. 1: 178. 1863; Cheesem. Man. N. Z. Fl. 73. 1906, ed. 2. 568. 1925; F. M. Bailey, Weeds & Pois. Pl. Queensl. 22. *f.* 37. [1907].

VITI LEVU: Lautoka: Mountains near Lautoka, alt. about 600 m., *Greenwood 952* (GH) (entire plant light green; creeping on mud under two inches of slowly running water, in taro plantation).

This species, until Greenwood (l. c.) mentioned it, had previously been reported only from Australia and New Zealand. The collection of a specimen of *Elatine* in Fiji is of especial interest, since, to the best of my knowledge, only one other collection of the genus has previously been cited in literature from the entire Pacific region (other than New Zealand). The earlier collection was *Seemann 183*, from the island of Taveuni, Fiji, which was referred by Seemann (Fl. Vit. 10. 1865) to *E. ambigua* Wight. According to Niedenzu (in E. & P. Nat. Pfl. ed. 2. 21: 276. 1925), *E. ambigua* and *E. gratioloides* are distinct species, the flowers being pedicellate in the former and sessile in the latter. Niedenzu states the range of *E. ambigua* to include Fiji, and I assume that his record is based upon *Seemann 183*. From an examination of a duplicate of this number in the Gray Herbarium, I am inclined to believe that it also represents *E. gratioloides*, since the flowers are usually essentially sessile, only rarely being on short pedicels about 1–2 mm. long. The value of pedicel-length as a specific character may be questioned, since in all other features *Seemann 183* agrees with *Greenwood 952* and the several New Zealand and Australian specimens in the Gray Herbarium. It seems probable to me that the only Fijian species of the genus is *E. gratioloides*, but the difference between this species and *E. ambigua* should be carefully checked.

Bentham, following his original description of *E. americana* var. *australiensis*, states: "This plant, whether a distinct species or a variety of the N. American one, is found also in New Zealand and the Fiji islands, and is very variable." His record from Fiji was doubtless based upon *Seemann 183*, which had been tentatively referred to *E. americana* by A. Gray in Bonplandia 10: 36. 1862.

In the most recent survey of the genus in its entire range, Niedenzu (l. c. 274–276) expresses the opinion that *E. gratioloides* is distinct from both *E. triandra* Schkuhr and *E. americana* (Pursh) Arn. The customary procedure by writers on the flora of Australia and New Zealand is to mention the austral plant as *E. americana* var. *australiensis* Benth. Fassett has recently reduced *E. americana* to varietal rank, as *E. triandra* var. *americana* (Pursh) Fassett (in Rhodora 33: 72. 1931, 41: 373. 1939), but the austral variety is not placed by him. It remains for a monographer to decide what status *E. gratioloides* merits; for the time being I follow Niedenzu in considering it a specific entity. The type was collected by R. Cunningham in 1833, in a bog at Tauraki, Hokianga River, North Island, New Zealand.

FLACOURTIACEAE

Flacourtia vitiensis (Seem.) comb. nov.

Thacombauia vitiensis Seem. Fl. Vit. 426. *pl. 100*. 1873.

Flacourtia ovata Gillespie in Bishop Mus. Bull. 83: 27. *f. 34* (excl. *a*, *f*, *g*). 1931.

The monotypic genus *Thacombauia* was originally described by Seemann as a member of the Humiriaceae, but subsequently it was questionably referred to the Euphorbiaceae by Durand, Pax, and Dalla Torre and Harms. A glance at Seemann's plate demonstrates the identity of the plant with *Flacourtia ovata,* which was recently emended by me in Sargentia 1: 61. 1942. While it is regrettable that the name honoring the famous King Thacombau thus falls into synonymy, nevertheless it is a source of satisfaction to place the genus.

MYRTACEAE

Syzygium phaeophyllum Merrill & Perry, nom. nov.

Eugenia durifolia A. C. Sm. in Bishop Mus. Bull. 141: 105. *f. 56.* 1936.

Syzygium durifolium Merrill & Perry in Sargentia 1: 76. 1942, non in Mem. Am. Acad. Arts & Sci. 18: 176. 1939.

Dr. E. H. Walker has called our attention to an oversight in our use of the specific epithet *durifolium* for two different species, the earlier from Borneo and the later from Fiji. Consequently, the Fijian species is here renamed. — E. D. Merrill and L. M. Perry.

MYRSINACEAE

Tapeinosperma Greenwoodii sp. nov.

Arbor ad 5 m. alta ubique partibus juvenilibus et inflorescentiis puberulis exceptis glabra, ramulis subteretibus rugulosis cinereis apicem versus 3–6 mm. crassis; foliis apicem ramulorum versus aggregatis, petiolis angulatis supra complanatis crassis (1.5–2 mm. diametro) 5–8 mm. longis, laminis chartaceis juventute copiose pellucido-punctatis mox opacis in sicco fusco-olivaceis elliptico-oblongis vel obovatis, 12–16 cm. longis, 5–8 cm. latis, basi gradatim angustatis et in petiolum decurrentibus, apice obtusis vel obtuse cuspidatis, margine saepe undulatis et paullo recurvatis, costa supra leviter canaliculata subtus prominente, nervis lateralibus primariis utrinsecus 15–20 cum aliis debilioribus interspersis patentibus rectis marginem versus anastomosantibus utrinque valde prominulis, rete venularum intricato utrinque paullo prominulo; inflorescentiis axillaribus multifloris tri- vel quadripinnatim paniculatis, 12–20 cm. longis, 6–14 cm. latis, pedunculo 4–6 cm. longo et rhachi ramulisque gracilibus dense brunneo-glanduloso-puberulis; bracteis deltoideo-oblongis circiter 1.1 × 0.7 mm. subacutis utrinque puberulis et margine ciliatis; pedicellis teretibus gracilibus 0.8–1 mm. longis puberulis; calyce rotato-cupuliformi circiter 2.5 mm. diametro, basi rotundato, extus parce glanduloso-puberulo, intus glabro, lobis 5 fere ad basim liberis late ovatis, circiter 0.8 × 1.1 mm., margine minute glanduloso-ciliolatis, apice emarginatis vel interdum rotundatis; corolla (paullo ante anthesin) circiter 3 mm. longa, lobis fere ad basim liberis ovatis 2–2.5 mm. latis, apice acutis, superne leviter punctatis; staminibus prope basim corollae insertis subsessilibus, antheris elongato-deltoideis circiter 1 × 0.8 mm. saepe glandulas 2 vel 3 dorso gerentibus; gynaecio sub anthesi circiter 1.6 mm. longo, ovario ovoideo in stylum gracilem circiter 1 mm. longum attenuato, stigmate minuto subpeltato, placenta ovoidea 2-ovulata.

VITI LEVU: Lautoka: Mt. Evans, alt. about 900 m., *Greenwood 944* (A, TYPE), Oct. 25, 1942 (small tree 3–5 m. high, the inflorescences lax, dependent).

Tapeinosperma Greenwoodii is most closely allied to *T. clavatum* Mez, with which it has in common short petioles, elliptic leaf-blades of moderate size and with prominulous venation, and ciliate and usually emarginate calyx-lobes. However, the new species has a much more ample and more complex inflorescence, the pedicel is slender and not conspicuously swollen distally into a conical calyx like that of *T. clavatum*, and the flowers are smaller throughout. The calycine character seems dependable, as the several specimens of *T. clavatum* examined have the calyx as described by Gillespie (in Bishop Mus. Bull. 74: 9. *f. 8.* 1930). The new species may also be compared with *T. Hornei* Mez, a species with long-petiolate large leaves, a shorter, simpler, and lepidote inflorescence, and larger flowers with acute or acuminate calyx-lobes.

RUBIACEAE

Mussaenda L.

Although it has been customary to refer the Pacific representatives of *Mussaenda* to *M. frondosa* L., examination of specimens and literature indicates that this is erroneous. Students of the Pacific floras have apparently been aware of this fact, but no alternative identification has been seriously suggested for the common Pacific plant, which is, in some areas, one of the most abundant elements of second growth vegetation. However, a species supposedly endemic to Raiatea, *M. raiateensis* J. W. Moore, was described in 1933. A careful examination of abundant Pacific material of the genus, including an isotype of *M. raiateensis* (for the loan of which I am greatly indebted to Dr. Moore, of the University of Minnesota), inclines me to believe that a single species occurs from the New Hebrides to the Society Islands, to which Moore's binomial may be applied. A discussion of the relationships of this Pacific species and an emended description follow.

The Linnaean species, *M. frondosa* (Sp. Pl. 177. 1753), is based upon several earlier references, among them Linnaeus' Flora Zeylanica (p. 35. 1747) and Burman's Thesaurus Zeylanicus (p. 165, *tab. 76.* 1737). The actual type is a collection of Hermann from Ceylon. The Ceylon plant described in the above references, and further amplified by Trimen (Handbook Fl. Ceylon 2: 323. 1894), is a scrambling shrub, with the branchlets, leaves, and the enlarged calyx-lobe densely and closely velutinous-tomentose. A representative specimen from Ceylon is *J. M. de Silva 38* (A).

The actual geographical range of *M. frondosa* is in doubt, but its occurrence in the eastern Malaysian and the Pacific regions is highly questionable. In their recent work on the genus in Papuasia (in Jour. Arnold Arb. 25: 192–196. 1944), Merrill and Perry did not find the species represented in the available material. The true *M. frondosa*, as represented by specimens from Ceylon and India, differs from the Pacific entity not only in its habit and its generally more obvious pubescence, but also in its longer normal calyx-lobes (5–10 mm. long), in its anthers being more deeply inserted on the corolla-tube (tips of anthers 4–9 mm. below apex of tube), and in its fruit being elenticellate or essentially so.

A closer relative of the Pacific plant than *M. frondosa* is *M. philippica* A. Rich., of the Philippine and Solomon Islands. In common with the Pacific entity, Richard's species differs from *M. frondosa* in its more highly placed stamens and its lenticellate fruits. From *M. philippica,* the Pacific plant differs in its longer and more or less subulate, rather than deltoid-lanceolate, calyx-lobes, and in its comparatively thick pericarp, which, when mature, remains firm and does not readily break. Another species of the Solomon Islands, *M. Kajewskii* Merr. & Perry (in Jour. Arnold Arb. 25: 194. 1944), is very close to *M. philippica* and differs from the Pacific plant in the same characters pertaining to comparatively short calyx-lobes.

The common *Mussaenda* of Micronesia has been mentioned in the literature as *M. frondosa* L. (Volkens in Bot. Jahrb. 31: 475. 1901; Safford in Contr. U. S. Nat. Herb. 9: 330. 1905; Merr. in Philip. Jour. Sci. Bot. 9: 147. 1914; Fosberg in Occ. Pap. Bishop Mus. 15: 215. 1940) and *M. sericea* Bl. (Valeton in Bot. Jahrb. 63: 300. 1930; Kanehira in Bot. Mag. Tokyo 45: 351. 1931, Fl. Micrones. 369. 1933, in Jour. Dept. Agr. Kyushu Univ. 4: 421. 1935). This Micronesian *Mussaenda* is certainly not *M. frondosa* in the limited sense of Ceylon and Indian plants, and its identity with *M. sericea,* based on a Moluccan specimen, is open to doubt. However, I see no reason to exclude the Micronesian specimens now available to me (*Kanehira 90, 1157, 1177, 1993, Herre 12* [all NY]) from *M. philippica* A. Rich. At any rate, these Micronesian plants differ from those of the more southerly islands (New Hebrides to Societies) in the characters above discussed for *M. philippica.*

Another species of *Mussaenda* occurring in the Pacific region is *M. cylindrocarpa* Burck, found in the New Hebrides (Guillaumin in Jour. Arnold Arb. 13: 4. 1932) but apparently not extending farther east into the Pacific. This species is characterized by having its stamens deeply inserted on the corolla-tube and its fruit cylindric, and it is not concerned in a discussion of the identity of the species which is so abundant in Fiji, Samoa, and eastward.

To summarize, it seems obvious that the common *Mussaenda* which extends from the New Hebrides to Rarotonga is amply distinct from *M. frondosa* L. and that its closest allies are more probably *M. philippica* A. Rich. and *M. Kajewskii* Merr. & Perry. This entity does not appear separable from *M. raiateensis* J. W. Moore, although it is a fairly variable species, in which subspecific divisions may eventually seem desirable. For the time being I cannot tie up the slight morphological variations, such as those pertaining to the degree of pubescence, with geographical regions. The following description is based on all material of the species now available to me.

Mussaenda raiateensis J. W. Moore in Bishop Mus. Bull. 102: 44. 1933.

Mussaenda frondosa sensu Forst. f. Fl. Ins. Austr. Prodr. 17. 1786; A. Rich. Sert. Astrolab. 2: ix. 1834; Endl. in Ann. Wien. Mus. Naturgesch. 1: 175. 1836; Guillemin in Ann. Sci. Nat. Bot. II. 7: 251. 1837; Seem. in Jour. Bot. 2: 72. 1864, Fl. Vit. 123. 1866; Powell in Jour. Bot. 6: 370. 1868; Engl. in Bot. Jahrb. 7: 477, pro parte. 1886, Forschungsr. Gazelle Siphon. 46, pro parte. 1889; Drake, Ill. Fl.

Ins. Mar. Pac. 189. 1890; Hemsl. in Jour. Linn. Soc. Bot. 30: 180. 1894; Reinecke in Bot. Jahrb. 25: 690. 1898; Burkill in Jour. Linn. Soc. Bot. 35: 40. 1901; Cheesem. in Trans. Linn. Soc. Bot. II. 6: 282. 1903; Gibbs in Jour. Linn. Soc. Bot. 39: 151. 1909; Wilder in Bishop Mus. Bull. 86: 102. 1931; Guillaumin in Jour. Arnold Arb. 13: 4. 1932; Fosberg in Bull. Torr. Bot. Club 67: 420. 1940; non L.

?Mussaenda formosa sensu Seem. Fl. Vit. 123, as synonym. 1866 (forsan quoad Forst. Icon. ined. *t. 56, 57*), non Jacq.

Mussaenda frondosa var. *pilosissima* sensu Reinecke in Bot. Jahrb. 25: 690. 1898; Rechinger in Denkschr. Akad. Wiss. Wien 85: 368. 1910 (repr. 3: 194); Setchell in Carn. Inst. Publ. 341: 43. 1924; non Engl.

Mussaenda sp. Christoph. in Bishop Mus. Bull. 128: 199. 1935.

Shrub or slender tree 2–10 m. high, sometimes said to be epiphytic or subscandent, the branchlets slightly flattened when young, densely hispidulous with pale or brownish hairs 0.3–0.5 mm. long, at length terete, glabrescent, brownish, striate, gray-lenticellate; stipules interpetiolar, 7–17 mm. long, deeply bifid, sericeous toward base, sparsely hispidulous distally, soon caducous, each lobe subulate-lanceolate; petioles slender, subterete or shallowly canaliculate, 5–25 (–40) mm. long, densely hispidulous to glabrescent like the branchlets; leaf-blades papyraceous, olivaceous or brownish when dried, often slightly paler beneath, ovate or oblong-elliptic, 10–18(–20) cm. long and 5–10(–14) cm. broad (uppermost leaves sometimes smaller), acute to attenuate (rarely subrounded or obtuse) at base and decurrent on the petiole, gradually acuminate at apex (acumen 5–30 mm. long), entire or lightly undulate at margin, sparsely hispidulous (often densely so on veins) and often soon glabrescent above, more densely hispidulous beneath (especially on nerves and in axils, the hairs pale, spreading, 0.5–1 mm. long) but at length often essentially glabrescent, the costa nearly plane or raised above, prominent beneath, the secondary nerves 7–10(–12) per side, ascending, curved or nearly straight, prominulous above, strongly elevated beneath, the veinlet-reticulation copious, plane or faintly impressed on both sides; inflorescence terminal, several- to many-flowered, often wide-spreading at maturity and up to 12 cm. long and broad but usually much smaller, the branches and pedicels hispidulous like the petioles or puberulent, essentially glabrous in fruit, the pedicels slender, short, up to 5 mm. long or essentially none, the bracts (up to 6 mm. long) and the minute bracteoles linear-subulate and soon caducous; calyx-tube oblong-cylindric or turbinate, at anthesis 3–5 mm. long, hispidulous or sericeous with pale or brown hairs 0.1–0.5 mm. long, the lobes 5, erect, linear-subulate, 4–6.5 mm. long, hispidulous, glabrescent within and distally, one lobe often enlarged; enlarged calyx-lobe membranaceous, white or yellowish, ovate or ovate-lanceolate, 5–8(–10.5) cm. long, 2.5–6.5 cm. broad, attenuate to obtuse at base and contracted into a slender stipe 5–20 mm. long, short-acuminate or cuspidate at apex, sparsely hispidulous on both sides or glabrescent, several-nerved from base, the veinlet-reticulation often obvious; disk annular, glabrous; corolla slenderly infundibular, pale yellow proximally, yellow or orange distally, 23–40 mm. long including lobes, the tube hispidulous or sericeous (often inconspicuously so) without, glabrous or subglabrous within toward base and distally (above attachment of anthers) copiously and densely soft-strigose with pale ascending hairs about 1 mm. long, the lobes 5, spreading, oblong or ovate-deltoid, 3–6.5 mm. long and broad, cuspidate at apex, usually puberulent without and copiously glandular-

puberulent within; stamens 5, glabrous, inserted in throat of corolla (tip of anthers 1–3 mm. below apex of corolla-tube), the filaments very short, the anthers linear, 3.5–5.5 mm. long, acute at apex, sagittate at base; style filiform, glabrous, equaling or slightly exceeding the corolla-tube, bifid for about 1.5 mm. at apex; fruit ellipsoid or turbinate, glabrous at maturity, green when fresh, brownish or blackish when dried, 10–15 mm. long, 7–11 mm. broad, truncate at apex, obtuse at base and contracted into a slender stipe 2–4 mm. long, the calyx-lobes caducous or the enlarged one sometimes subpersistent, the pericarp firm, copiously marked with large gray elliptic lenticels, the seeds minute, black, reticulate.

DISTRIBUTION: New Hebrides, Fiji, Samoa, Tonga, Rarotonga, and Society Islands; probably also in some of the adjacent groups. Reported from a variety of habitats, including clearings, thickets, open forest, and occasionally rain-forest; in Fiji it is one of the commonest plants in second growth thickets and is rarely absent from this habitat. Reported altitudes range from sea-level to 900 m. The type is *Moore 684* from Raiatea.

NEW HEBRIDES: ANEITYUM: *Milne* (NY); Anelgauhat Bay, *Kajewski 922* (A, NY). FIJI: VITI LEVU: Lautoka: Mountains near Lautoka, *Greenwood 164* (A); Tholo North: Nandarivatu, *Degener & Ordonez 13526* (A, NY), *Reay 9* (A); Sovutawambu, near Nandarivatu, *Degener 14602* (A, NY); Naitasiri: Vicinity of Nasinu, *Gillespie 3555* (NY); Waindina River basin, *MacDaniels 1053* (A). KANDAVU: Namalata Isthmus region, *Smith 25* (GH, NY). VANUA LEVU: Thakaundrove: Hills south of Nakula Valley, *Smith 330* (GH, NY); Valanga, Savu Savu Bay, *Degener & Ordonez 13987* (A, NY); summit of Uluinabathi Mt., Savu Savu Bay region, *Degener & Ordonez 13936* (A, NY); Maravu, near Salt Lake, *Degener & Ordonez 14185* (A). TAVEUNI: Vicinity of Wairiki, *Gillespie 4754* (NY). OVALAU: Vicinity of Levuka, *Gillespie 4471* (NY), *Degener & Ordonez 13795* (A, NY). MAKONDRONGA: *Degener & Ordonez 13814* (A, NY). KORO: Eastern slope of main ridge, *Smith 1030* (NY). ONEATA: *U. S. Expl. Exped.* (NY). FULANGA: *Smith 1173* (NY). Fiji, without other locality: *U. S. Expl. Exped.* (GH, NY), *Seemann 238* (GH), *Horne* (GH), *Prince* (GH). SAMOA: SAVAII: Vaipouli, *Vaupel 355* (NY); Salailua, *Christophersen 2999* (NY). UPOLU: Near Malololelei, *Christophersen 323* (NY). TAU: Fitiuta trail back of Luma, *Garber 610* (NY). Samoa, without other locality: *U. S. Expl. Exped.* (GH). TONGA: TONGATABU: Along the Hala Loto, *Setchell & Parks 15490* (GH). EUA: Western edge of the Plateau, *Parks 16200* (A, GH, NY). COOK ISLANDS: RAROTONGA: *Parks & Parks 22209* (GH). SOCIETY ISLANDS: RAIATEA: West side of highest mountain, March 24, 1927, *Moore 684* (TYPE COLL., herb. Univ. Minnesota).

COMMON NAMES (and sources): In Fiji: *Mbovu* or *Mbovo* (all collectors), *Vakatharendavui* (Smith), *Vombo* (Reay); in Samoa: *Uto'uto, Ma'osina* (Powell), *Fua i tausaga, Laupaepae* (Setchell), *Alo alo vao, Fue* (Christophersen); in Rarotonga: *Kotuku* (Cheeseman, Wilder).

NATIVE USES: In Fiji decoctions of the leaves and bark are commonly used as a cure for fever, chest complaints, and kidney diseases.

Airosperma

Airosperma Lauterb. & K. Schum. in K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 565. 1901.

Abramsia Gillespie in Bishop Mus. Bull. **91**: 27. 1932.

Dr. L. M. Perry has kindly pointed out to me the apparent similarity of *Airosperma* (with four species endemic to New Guinea) and *Abramsia* (monotypic and supposedly endemic to Fiji). Careful examination of the literature and the available specimens indicates that these two generic con-

cepts are essentially identical. We thus have another illustration of a genus extending from New Guinea to Fiji, presumably to be anticipated in the intervening island groups, from which it has not yet been reported.

In their original discussion of *Airosperma*, Lauterbach and K. Schumann place the genus in the "Albertinae," pointing out its essential characters of pendulous solitary ovules and contorted corolla-lobes. In the classification of K. Schumann (in E. & P. Nat. Pfl. IV. 4: 16. 1891), this appears to be correct, and *Airosperma* may be placed in the Coffeoideae-Guettardinae-Alberteae (op. cit. 87–89). This is the position assigned to the genus by Krause (in E. & P. Nat. Pfl. Nachtr. 3: 328. 1908).

Gillespie, in placing his new genus *Abramsia*, expresses a belief that its relationships are in the Ixoreae; the pendulous ovules, however, would seem to exclude consideration of this or any other division of the Psychotriinae. Gillespie emphasizes precisely the same combination of characters which differentiates *Airosperma*, and indeed his illustration (op. cit. *fig. 31*) shows that the fundamental characters of *Abramsia* are similar to those of *Airosperma* (illustrated in K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee *t. 21*. 1901).

Although the specific epithets originally associated with *Airosperma* were *psychotrioides* and *ramuensis*, and although subsequent discussions have treated the generic name as feminine, it must be considered neuter, according to Art. 72 (2) of the International Rules of Botanical Nomenclature (1935).

Airosperma trichotomum (Gillespie) comb. nov.

Abramsia trichotoma Gillespie in Bishop Mus. Bull. 91: 29. *fig. 31*. 1932; Fosberg in Bull. Torrey Bot. Club 67: 422. 1940, in Sargentia 1: 125. 1942.

Airosperma trichotomum is known from several collections from the Fijian islands of Viti Levu, Vanua Levu, and Taveuni, which are cited in the listed publications. The available material shows that the species is fairly variable as to leaf-size, but in important respects it is reasonably consistent.

Although linear calyx-lobes characterize *Airosperma psychotrioides* (the illustrated New Guinean species), other species of the genus, notably *A. grandifolium* Val., have the calyx-lobes more or less deltoid. In the Fijian species the calyx-lobes are still smaller, but this character is hardly of generic value. Gillespie's species is also marked by its large thin leaves and comparatively ample inflorescences.

Mastixiodendron

Mastixiodendron Melchior in Bot. Jahrb. 60: 167. 1925.

Dorisia Gillespie in Hook. Ic. Pl. 32: *pl. 3190*. 1933.

Mastixiodendron and *Dorisia* were both originally described as members of the Cornaceae allied to *Mastixia* Bl. Gillespie's genus was transferred to the Rubiaceae by the present writer in 1936 (in Bishop Mus. Bull. 141: 140) and was referred to the tribe Chiococceae, but at that time *Mastixiodendron* was insufficiently known to me to be carefully considered. More recently Merrill and Perry (in Jour. Arnold Arb. 23: 416. 1942) have

also removed *Mastixiodendron* from the Cornaceae to the Rubiaceae,[1] commenting on its close relationship to *Dorisia*. Further examination of the two specific entities involved demonstrates that the differences between them are scarcely generic in nature. Those differences pointed out by Gillespie deal merely with the comparative length and position on the fruit of the calyx-tube and appear to be of specific value only.

In order to have the reduction of *Dorisia* to *Mastixiodendron* verified, ample material of the two species involved — *Dorisia flavida* (Seem.) A. C. Sm. from Fiji and *Mastixiodendron pachycladon* [*"pachyclados"*] (K. Schum.) Melchior from New Guinea — was submitted to Dr. Charlotte G. Nast for study. Her report states that: *"Dorisia* and *Mastixiodendron* could be taken as congeneric. Their nodal anatomy (trilacunar), stomata (the usual rubiaceous type), wood, and pollen are similar. The wood has oblique-porous vessels, septate fibers, no wood parenchyma, and fairly short heterogeneous rays. The tricolpate pollen grain has a fairly fine but distinctly reticulate exine. *Mastixia* Bl. is not related to *Mastixiodendron*. The wood of the two genera is entirely different, that of *Mastixia* having scalariform vessels with many bars, diffuse-aggregate parenchyma, and very long heterogeneous rays. The stomata of *Mastixia* are not of the rubiaceous type, and the tricolpate pollen grain is very finely reticulate, almost granular in appearance, the pores being smaller and the grooves larger than those of the pollen grain of *Mastixiodendron*."

In view of this evidence, and because of the lack of differentiating taxonomic characters, it appears that *Dorisia* may be incorporated in the older genus. *Mastixiodendron,* as thus amplified, has a range extending from Halmahera (see Merrill and Perry in Jour. Arnold Arb. **25**: 205. 1944) through New Guinea to Fiji. Its discovery in the Solomons and New Hebrides is to be anticipated and would complete a very natural geographical distribution.

Mastixiodendron flavidum (Seem.) comb. nov.

Canthium flavidum Seem. Fl. Vit. 132. 1866.
Plectronia flavida Benth. & Hook. f. ex Drake, Fl. Ins. Mar. Pac. 194. 1890.
Dorisia rarissima Gillespie in Hook. Ic. Pl. **32**: *pl. 3190*. 1933.
Dorisia flavida A. C. Sm. in Bishop Mus. Bull. **141**: 140. 1936; Fosberg in Sargentia **1**: 120. 1942.

This species is known from the Fijian islands of Vanua Levu, Rambi, and Viti Levu, as mentioned in the above-cited publications. Gillespie mentions *Horne 1132,* and Fosberg *Parham III,* as pubescent-leaved individuals possibly worthy of nomenclatural recognition. These two specimens, both in fruit, appear to the present writer to represent an undescribed species.

Mastixiodendron pilosum sp. nov.

Arbor, ramulis leviter angulatis demum subteretibus cinereisque, apicem versus copiose puberulis; stipulis rigidis oblongo-lanceolatis 18–25 mm. longis inconspicue puberulis mox caducis; petiolis subteretibus vel leviter canaliculatis robustis (1–2 mm. diametro) 2–4 cm. longis dense puberulis;

[1] Apparently *Mastixiodendron* was first referred to the Rubiaceae by Danser (in Blumea **1**: 69. 1934), in his study of the Cornaceae of the Netherlands Indies.

laminis chartaceis in sicco fuscis subtus pallidioribus oblongo-ellipticis, 12–22 cm. longis, 6–9.5 cm. latis, basi acutis et in petiolum decurrentibus, apice obtusis vel obtuse cuspidatis, margine integris paullo recurvatis, supra glabris subnitidis, subtus pilis pallidis patulis 0.1–0.4 mm. longis conspicue et persistenter molliter pilosis, costa conspicua supra subplana vel leviter canaliculata subtus prominente, nervis secundariis utrinsecus 7–10 patentibus marginem versus curvatis et laxe anastomosantibus supra paullo subtus valde elevatis, rete venularum intricato utrinque prominulo; inflorescentiis thyrsoideis axillaribus ad 15 cm. longis pauciramosis, pedunculo longo ramulisque copiose pallido-puberulis, bracteis parvis mox caducis, pedicellis sub fructu gracilibus 2–4 mm. longis puberulis, bracteolis lanceolatis circiter 1 mm. longis inconspicuis subtentis; calyce post anthesim turbinato ut pedicello puberulo, limbo brevi persistente, lobis 4 vel 5 deltoideis acutis ad 1 mm. longis; corolla non visa; fructibus oblongo-ellipsoideis, ad 20 × 7 mm., basi et apice obtusis, praeter calycis lobos glabris, calycis limbo subnullo, lobis 4 vel 5 inconspicuis membranaceis late deltoideis minute hirtellis infra fructus apicem 2–3 mm. orientibus, pericarpio circiter 1 mm. crasso, exocarpio carnoso, mesocarpio tenui fibroso, endocarpio duro, loculis seminibusque 1 vel 2, seminibus oblongo-ellipsoideis ad 13 mm. longis et 2 mm. latis utrinque obtusis, testa conspicue reticulato-incrassata, albumine copioso albo.

VANUA LEVU: Mbua: Between Mbua and Ndevoka, *Mrs. H. B. R. Parham III* (A) (tree near creek; fruits orange). Fiji, without definite locality: *Horne 1132* (GH, TYPE). The Horne collection, the better of the two listed, was probably also obtained on Vanua Levu, from which the bulk of his collection came.

The leaves of *M. flavidum* (Seem.) A. C. Sm. are entirely glabrous beneath or very minutely puberulent on the costa and principal nerves, whereas those of the new species are densely, conspicuously, and persistently soft-pilose beneath with pale spreading hairs. The young branchlets, stipules, inflorescence-branches, fruiting pedicels, mature calyces, and persistent calyx-lobes of *M. pilosum* are similarly pubescent, the corresponding parts in *M. flavidum* being glabrous. These differences appear to be of specific value, and I doubt if such a well-defined species as *M. flavidum* should be interpreted to include the pubescent form here described as new.

Both of the Fijian species differ from the New Guinean *M. pachycladon* in their less robust habit, longer and more slender petioles, narrower leaf-blades, and more nearly completely inferior fruits.

COMPOSITAE

Erigeron sumatrensis Retz. Obs. Bot. 5: 28. 1789.

VITI LEVU: *Parks s. n.* (Bish); Tholo North: Nandarivatu, on open slopes, *Parks 20623* (Bish).

This widespread weed, often recorded under the later binomial of *E. linifolius* Willd. (1804), has been reported from only Hawaii and Easter Island in the Pacific region.

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